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Fig. 1

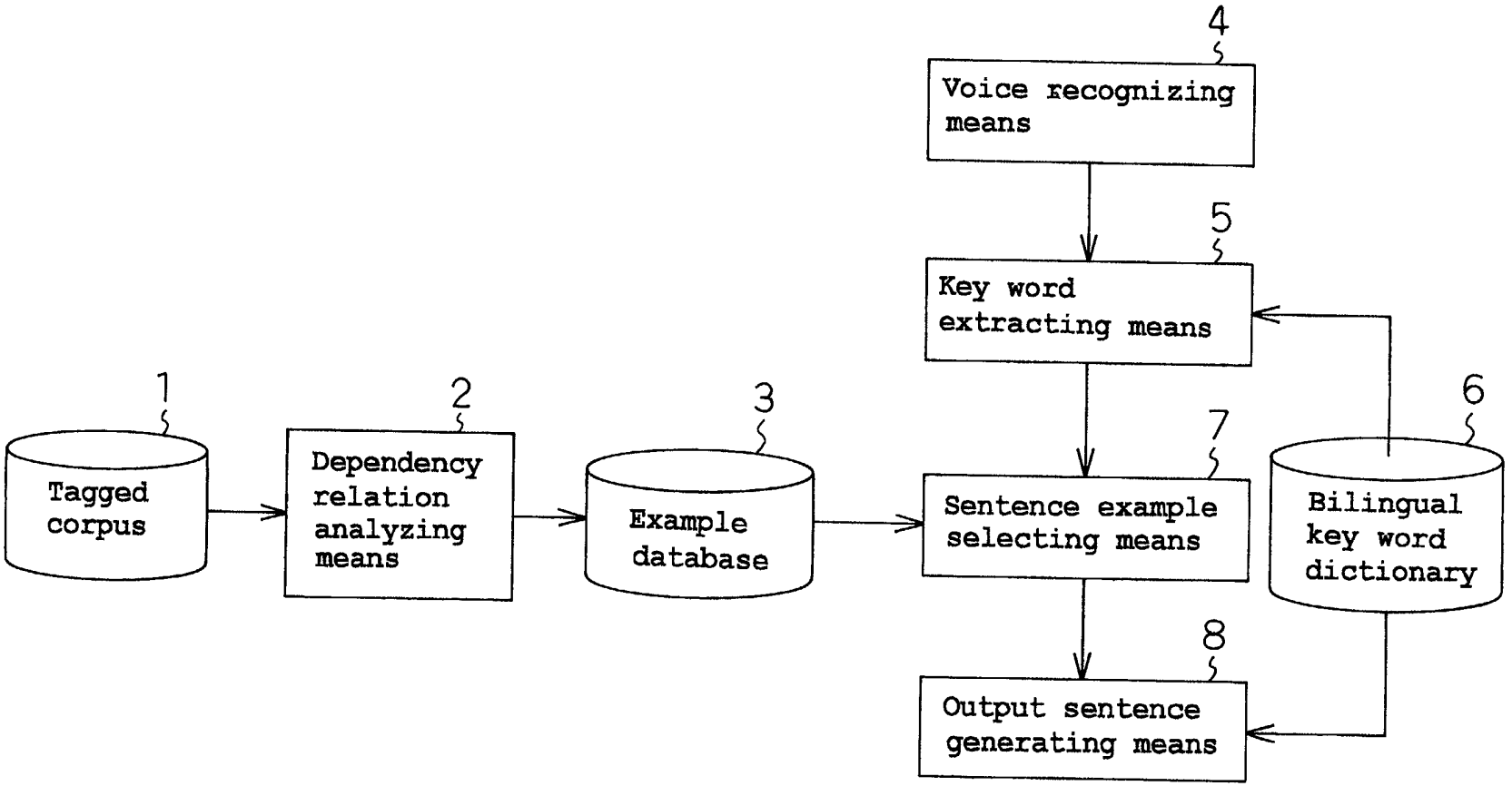


Fig. 2 (a)

Example of bilingual key word dictionary

kohi [コーヒー]	: coffee
onegai [お願い]	: *
miruku [ミルク]	: milk
tsumetai [冷たい]	: cold
ari [あり]	: *

Example of example DB

Dependency relation	: Expression pattern
(kohi [コーヒー]→onegai [お願い])	: I'd like to coffee please.
(tsumetai [冷たい]→miruku [ミルク]) (miruku [ミルク]→ari [あり])	: Do you have a cold milk ?
. . .	

Fig. 2 (b)

Example of tagged corpus

Kohi (common noun) | o (kaku-postpositional particle) | o (prefix) | negai (sahen-noun) | shi (verb) | masu (auxiliary verb)
[コーヒー（一般名詞）｜を（格助詞）｜お（接頭詞）｜願い（サ変名詞）｜し（動詞）｜ます（助動詞）]

Tsumetai (adjective) | miruku (common noun) | ha (kei-postpositional particle) | ari (verb) | masu (auxiliary verb) | ka (shu-postpositional particle) ・・・
[冷たい（形容詞）｜ミルク（普通名詞）｜は（係助詞）｜あり（動詞）｜ます（助動詞）｜か（終助詞）]
. . .

Fig. 3

Example of example DB

Dependency relation	: Expression pattern
(kohi [コーヒー] →onegai [お願い])	: Coffee please.
(tsumetai [冷たい] →miruku [ミルク]) (miruku [ミルク] →ari [あり])	: Any cold milk?
. . .	

Fig. 4

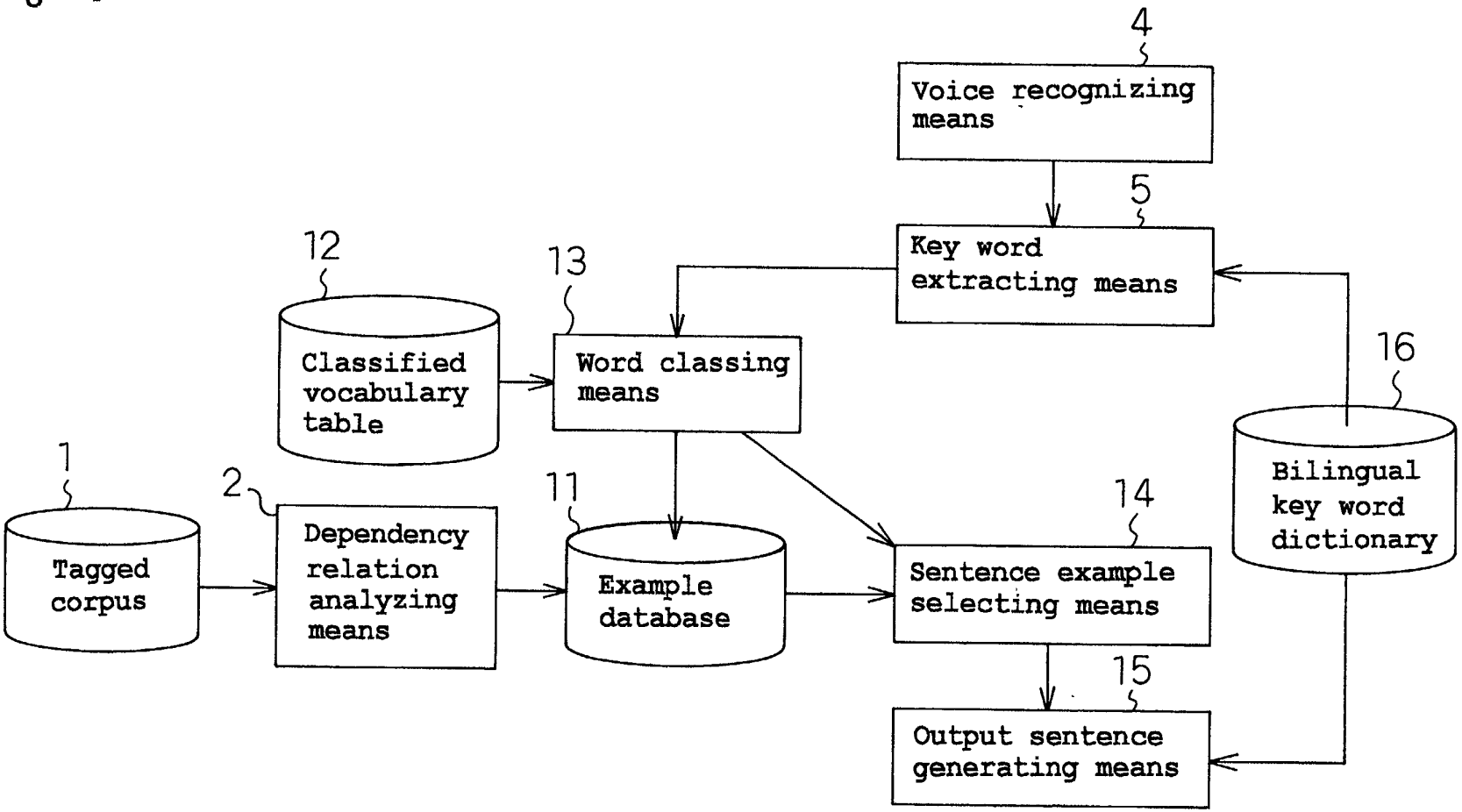

4
Voice recognizing means
5
Key word extracting means
12
Classified vocabulary table
13
Word classing means
16
Bilingual key word dictionary
1
Tagged corpus
2
Dependency relation analyzing means
11
Example database
14
Sentence example selecting means
15
Output sentence generating means

Fig. 5 (a)

Classified vocabulary table

kohi [コーヒー]	(common noun [一般名詞])	100
miruku [ミルク]	(common noun [一般名詞])	100
koucha [紅茶]	(common noun [一般名詞])	100
...		
tsumetai [冷たい]	(adjective [形容詞])	200
atsui [熱い]	(adjective [形容詞])	200
...		

Fig. 5 (b)

Example of example DB

Key word	: Dependency relation	: Sentence example
① 100 ② onegai [お願い]	: (①→②)	: I'd like to ② please.
① 200 ② 100 ③ ari [あり]	: (①→②) (②→③)	: Do you have a ① ② ?
...		

Fig. 6

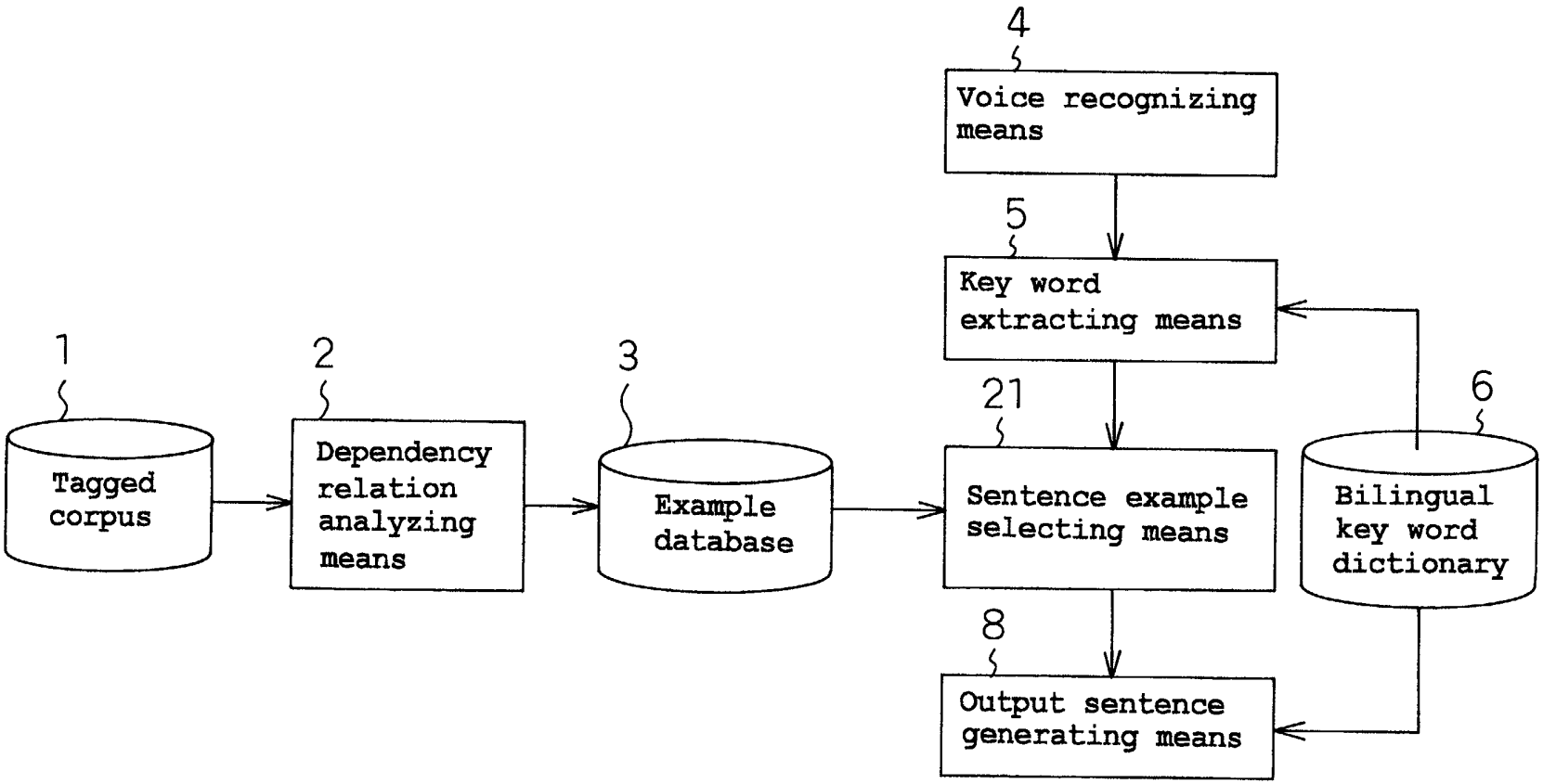

4
Voice recognizing means
5
Key word extracting means
1
Tagged corpus
2
Dependency relation analyzing means
3
Example database
21
Sentence example selecting means
6
Bilingual key word dictionary
8
Output sentence generating means

Fig. 7

Input sentence : Atsui miruku ha arimasuka [熱いミルクはありますか]

Recognition result sentence : Aoi miruku ha arimasuka [青いミルクはありますか]

Example of example DB

Dependency relation	Sentence example
(kohi [コーヒー]→onegai [お願い])	Coffee please.
(atsui [熱い]→miruku [ミルク]) (miruku [ミルク]→ari [あり])	Any hot milk ?
. . .	

Extracted key words : aoi [青い], miruku [ミルク], ari [あり]

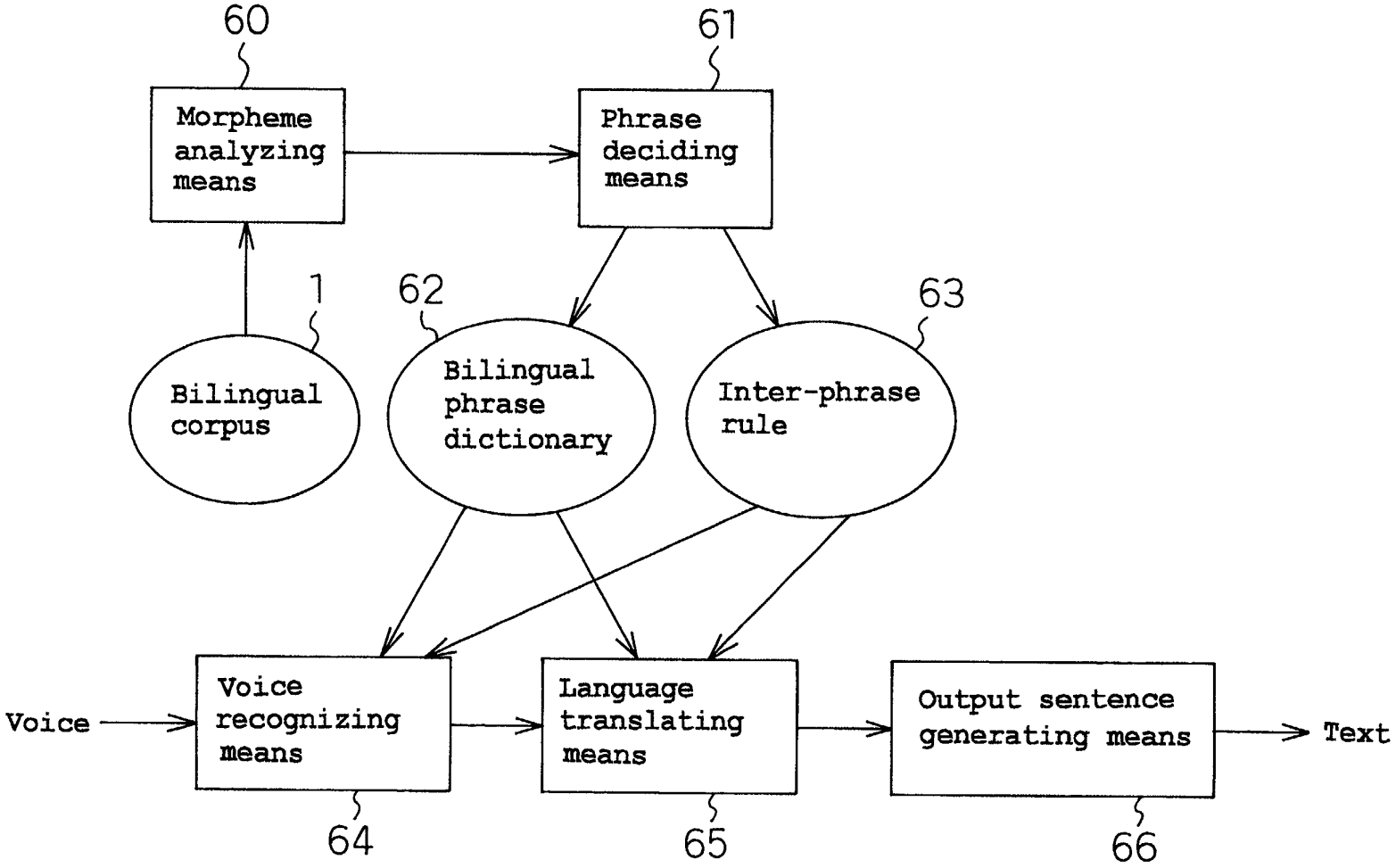
Result of dependency relation comparison between the key words and example DB :

(aoi [青い], miruku [ミルク]) ×

(aoi [青い], ari [あり]) ×

(miruku [ミルク], ari [あり]) ○

Fig. 8


60
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Morpheme analyzing means
Phrase deciding means
1
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Bilingual corpus
Bilingual phrase dictionary
Inter-phrase rule
Voice
Voice recognizing means
Language translating means
Output sentence generating means
Text
64
65
66

Fig. 9-1 (a)

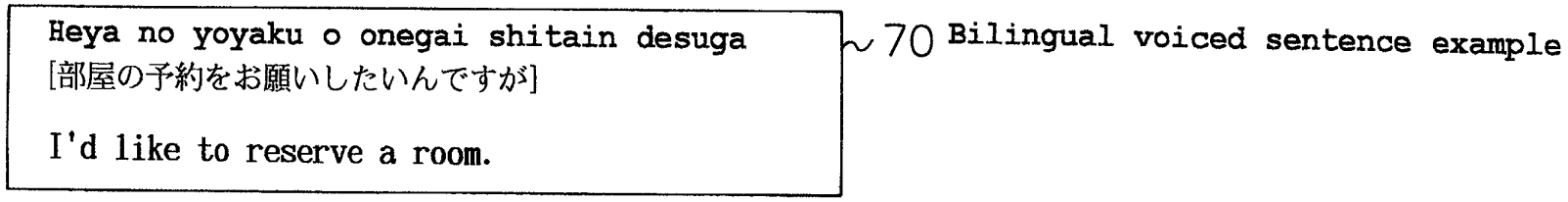

Fig. 9-1 (b)

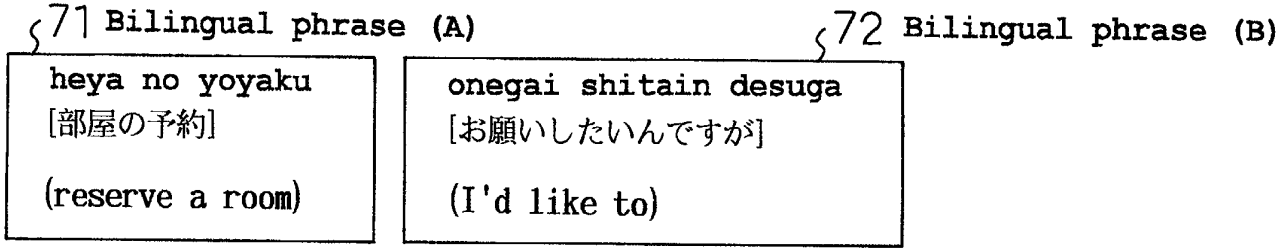

Fig. 9-1 (c)

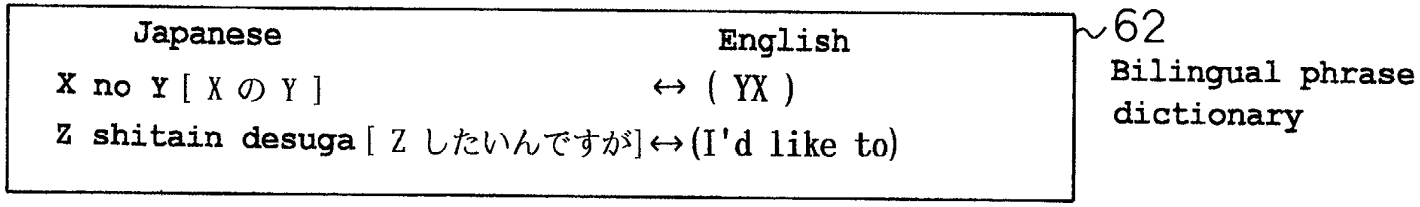

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Fig. 9-2 (d)

Japanese	English
(A) o (B) suru [(A)を(B) する]	↔((B) to (A))

63 Inter-phrase rule

Fig. 9-2 (e)

X (heya [部屋], kaigishitsu [会議室], kuruma [車], ・・・)
Y (yoyaku [予約], keiyaku [契約], ・・・)
Z (onegai [お願い], tanomu [たのむ], ・・・)
・・・

64 Classified vocabulary table

Fig. 10 (a)

Example of bilingual key word dictionary

coffee	:	kohi [コーヒー]
please	:	onegai [お願い]
milk	:	miruku [ミルク]
cold	:	tsumetai [冷たい]
have	:	ari [あり]

Example of example DB

Dependency relation	Expression pattern
(coffee→please)	: Kohi o onegai shimasu [コーヒーをお願いします]
(cold→milk) (milk→have)	: Tsumetai miruku ha arimasuka [冷たいミルクはありますか]
...	

Fig. 10 (b)

Example of tagged corpus

I (pronoun) | 'd (auxiliary verb) | like (verb) | to (determiner) | coffee (common noun) | please (adverb) |

...

Fig. 11 (a)

Classified vocabulary table

coffee	(common noun)	100
milk	(common noun)	100
tea	(common noun)	100
...		
cold	(adjective)	200
hot	(adjective)	200
...		

Fig. 11 (b)

Example of example DB

Key word	: Dependency relation	: Sentence example
① 100 ② please	: ① o [を] ② shimasu [します]	: ① o [を] ② shimasu [します]
① 200 ② 100 ③ have	: (①→②) (②→③)	: ①② ha [は] ③ masuka [ますか]
...		

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Fig. 12

Input sentence	: Do you have a hot milk ?
Recognition result sentence	: Do you have a head milk ?

Example of example DB

Dependency relation	: Sentence example
(coffee→please)	: Kohi o onegai shimasu [コーヒーをお願いします]
(hot→milk) (milk→have)	: Atsui miruku ha arimasuka [熱いミルクはありますか]
...	

Extracted key words : (have, head, milk)

Result of dependency relation comparison between the key words and example DB :

(head, milk) ×

(head, have) ×

(milk, have) ○

Fig. 13 (a)

Example of bilingual key word dictionary

咖啡	: kohi [コーヒー]
要	: kudasai [下さい]
日文	: nihongo [日本語]
菜单	: menyu [メニュー]
有	: ari [あり]

Example of example DB

Dependency relation	: Expression pattern
(咖啡 →要)	: Kohi o kudasai [コーヒーを下さい]
(日文→菜单) (菜单→有)	: Nihongo no menyu ha arimasuka [日本語のメニューはありますか]
...	

Fig. 13 (b)

Example of tagged corpus

要 (动) | 咖啡 (名词) |
...

Fig. 14 (a)

Classified vocabulary table

咖啡	(名)	100
牛奶	(名)	100
红茶	(名)	100
冷	(形)	200
热	(形)	200
日文	(名)	300
菜单	(名)	400
...		

Fig. 14 (b)

Example of example DB

Key word	: Dependency relation	: Sentence example
① 100 ② 要	: (①→②)	: ① o [を] ②
① 300 ② 400 ③ 有	: (①→②) (②→③)	: ① no [の] ② ha [は] ③ masuka [ますか]
	...	

Fig. 15

Input sentence : 有日文菜单吗

Recognition result sentence : 有日没菜单吗

Example of example DB

Dependency relation	: Sentence example
(咖啡→要)	: Kohi o kudasai [コーヒーを下さい]
(日文→菜单) (菜单→有)	: Nihongo no menyu ha arimasuka [日本語のメニューはありますか]
	...

Extracted key words : (有, 日没, 菜单)

Result of dependency relation comparison between the key words and example DB :

(日没, 有) ×

(日没, 菜单) ×

(菜单, 有) ○